Leveraging Digital Preservation Coalition Rapid Assessment Model on Digital Library Transformation: Conceptual Paper

Veninchia Gardenia Nauli, Prio Utomo(✉), and Kristianus Ade Sudiyono

Department of Technology Management, Universitas Multimedia Nusantara, Tangerang, Indonesia
veninchia.gardenia@student.umn.ac.id, prio.utomo@umn.ac.id, kristianus@lecturer.umn.ac.id

Abstract. Digital transformation has reached all business areas regarding the process, products, and services. One of the areas that is also concerning to this transformation urgency are libraries. Since the pandemic of Covid-19 limited physical access, library with its role to give their resources and services of knowledge gateways, aims to optimize their capabilities to be accessed widely. Examining the idea of digital transformation in libraries considering organizational and service capabilities is the primary goal of this paper, this including improvement that need to be following by the librarian and its collection management towards the trend of technology to be long term accessible. Researchers have traditionally focused on the technology forms and value of its development, while this research will focus on examining library capabilities to the digital transformation. To achieve this goal, the author will use digital maturity adopting from digital preservation coalition rapid assessment model that using eleven-dimension organization viability, policy and strategy, legal basis, information technology, continuous improvement, community, and others with simple method and based on good practices. The maturity model can be measured by comprehensive assessment to understand the current state and understanding gaps also priorities to measure the future state. The result of this future research may provide best practices of library assessment of its capabilities, that can be used as reference for traditional libraries to exist and continue their roles for many years.

Keywords: digital transformation · library · digital preservation · rapid assessment model

1 Introduction

The impact of digital transformation in libraries can be seen in areas such as service delivery, service use, library management, patronage of library services, and library material format. The demands of the day have been met by 21st-century libraries [1]. User expectations are rapidly revamping along with the developments in ICT and globalization [2]. Global pandemic challenges facing both the staff working in-house and at home are

© The Author(s) 2023
Nairobi et al. (Eds.): ICEBE 2022, AEBMR 241, pp. 267–274, 2023.
https://doi.org/10.2991/978-2-38476-064-0_29

not minimum. While certain issues have created significant impediments that hinder library staff's abilities to perform their duties, others have given them opportunities to learn, become more technologically savvy, and be creative and collaborative [3]. To deliver the best services in the shortest amount of time during the overcoming data, libraries and librarians must also keep up with the latest technological advancements [4].

The American Digital Library Federation has defined the digital library as "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collection of digital works so that they are readily and economically available for use by a defined community or set of communities." [5].

Digital formats are used more frequently to produce and communicate our cultural, historical, and scientific heritage. The ubiquity, pervasiveness, variety, and fluidity of such content generate various difficulties about the role of research libraries and archives in digital preservation in the face of quick organizational and technological change as well as changeable organizational aims. To maintain the validity, correctness, and functionality of content throughout time in the face of administrative and technological changes, digital preservation involves managing and maintaining digital artifacts.

The care of primary sources and cultural heritage materials through generations has traditionally been the responsibility of archives, national libraries, and research libraries to guarantee long-term access [6]. Tools for relevant, dependable, and valid evaluation will be required if library-based making is utilized to promote learning opportunities and advance library objectives. Meeting the needs of customers and librarians in terms of assessment is one of the objectives of libraries. Knowing who is being assessed, where they are being assessed, and what learning is being assessed is the foundation of assessment design. [7]. Management of digital repositories and archives must take assessment into account. It frequently serves as a strategic decision-making and resource investment input. Organizations using a framework must be able to trust the diagnosis provided by the assessment model and supplied through application of the assessment technique, regardless of whether assessment is done for certification or improvement [8].

The Digital Preservation Coalition Rapid Assessment Model (DPC RAM) is a new resource from the DPC and builds upon other maturity models including the National Digital Stewardship Alliance (NDSA) levels and Digital Preservation Capability and Maturity Model (DPCMM). DPC RAM is notable by being designed to be simple to use and includes a self-assessment worksheet and graphical analysis [9]. The iPRES 2018's Digital Preservation Storage Criteria (or "Criteria") is the outcome of a collaborative effort based in the digital preservation community. As digital preservation programs advance, technology choices appear and develop, and possibilities and constraints become more apparent, criteria are aimed to accommodate changing organizational requirements [10].

Presented on iPRES 2021, the ARCHIVER digital preservation project using DPC RAM to be use on Long Term Digital Preservation (LTDP) to follow Findable, Accessible, Interoperable, and Reusable (FAIR) guiding principles [11]. With the emergence of library towards to the digital era and long-term availability, DPC RAM model can

provide a comprehensive assessment of current situation and improve the capabilities of the future needs.

2 Literature Review

A. *Library Transformation*

Libraries now face competition from a variety of technologies that provide quick access to free information resources as the world of digital information continues to grow. Therefore, the obvious digitization of books is only one aspect of the digital transformation of libraries. It can also have an impact on the structure and overall goals of the library, such as changing it from a "book-centered" knowledge center to a "Technology supported learning-center," where online learning services and cutting-edge technological systems make it simple to access a new learning culture [12].

Library leaders must go beyond their own walls to understand the issues the university is facing and what possible contributions they might make to bridging technology and people for mutual benefit. The challenges of teaching and learning, digital scholarship, the digital student experience, and organizational business transformation are starting to be turned into opportunities by librarians in the west, who are thereby playing a crucial role in enabling and facilitating the university digital transformation [13]. The current era's new trend is digital libraries, institutional repositories, and open archives, which meet users' demands for exact information since they are more information-conscious while accessing electronic information for varied objectives, such as academic or research needs [14].

The proficient and professional fronts with roles and responsibilities have also been changed and library professionals called as information promoter, consortia administrator, consultant, Comfortable manager, facilitator, guide/teacher, knowledge manager, researcher, etc. Application of (ICTs), in the library surroundings has moved libraries from the traditional to hybrid and then automated library, digital library and virtual library [15]. Digital preservation consists of a combination of people, processes, and technology that together give us the capabilities to record, store, and make digital items accessible for whatever long we may need. All the tasks required to maintain and manage digital artifacts so that they can be accessed and used by future users collectively are referred to as "digital preservation." To improve our processes, policies, staff training program, IT set up, and other areas, digital preservation has involved more than just purchasing a solution to add to our already complex digital landscape [16].

B. *Digital Maturity Model*

A system's "maturity" refers to a state of being finished, ideal, or prepared and is the end result of system development. Organizations and other maturing systems, for instance, develop their capacities over time in order to achieve a desired future state. It outlines what a business has already accomplished in terms of transformation initiatives and how a business methodically gets ready to adapt to a more digital world in order to remain competitive. A maturity model outlines the usual paths that businesses take when undergoing transformation and offers some advice on how to approach such a process.

Companies can evaluate their readiness for the digital transformation using digital maturity models that take into account a number of different factors. An area of action is described by a dimension, which is a particular, quantifiable, and autonomous component that reflects a significant, fundamental, and distinctive characteristic of digital maturity [17]. This mostly entails the immediate actions that these models advise businesses to do in order to create a digital ecosystem and dominate their respective markets. This relates to the several areas of attention including improving the customer experience, using effective strategy, and implementing digital technology [18] (Fig. 1).

In libraries, process improvement has taken on more significance, particularly in the setting of higher education. The instruments used to quantify efficacy and evaluate the quality of library services are always changing. Evaluated and in charge. The software engineering industry's implementation of capability maturity within a framework gave rise to the Capability Maturity Model (CMM). A CMM outlines the requirements and traits that must be met to achieve each of the five levels of capability maturity [19] (Fig. 2).

Almost no organization is immune from the need to proactively handle the requirements of long-term information assets maintained in digitally encoded formats and systems now that the majority of business information is "born digital". A common complaint from the communities of archives, libraries, records management that it is challenging to ensure access to genuine, usable electronic records with long-term operational, regulatory, legal is so complex, perplexing, and expensive. In the Digital Preservation Capability Maturity Model (DPCMM), authenticity, access, and preservation of authentic, accessible, and reliable electronic records over the long term are supported by this capability maturity model's fifteen (15) components, or major process areas. Each element is explained, and metrics are specified for each of the five (5) degrees of digital

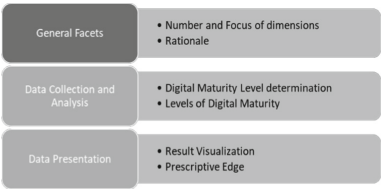

Fig. 1. Design Parameter of Maturity Model

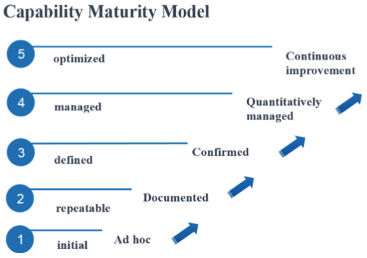

Fig. 2. Capability Maturity Model

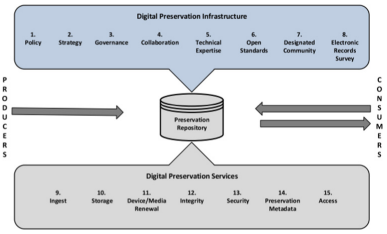

Fig. 3. Digital Preservation Capability Maturity Model

preservation capabilities. Before the next higher level may be reached, conformance and consistent performance at any given level are necessary [20] (Fig. 3).

Existing maturity models focus on fields, restrict their scope to a particular subset of preservation considerations, or promote specific preservation methods. The approach should make it simple for organizations to evaluate where they are right now and think about where they want to be in the future. The Digital Preservation Coalition Rapid Assessment Model (DPC RAM) is a maturity modelling tool to enable a rapid benchmarking of an organization's digital preservation capability that offers a collection of organizational and service level skills that are evaluated using a clear and uniform set of maturity levels. This model aspires to be: (1) Adaptable to businesses of any size and in any industry; (2) Compatible with any long-term value content; (3) Preservation strategy and solution agnostic; (4) Based on existing good practice; and (5) Simple to comprehend and quick to implement. On the level that is most like its current condition, this evaluation should be truthful and reasonable. The score given should be the level below when an organization only partially satisfies a level but believes that additional work is necessary to sit comfortably inside that level [21]. By determining this 3-maturity model, researchers see that DPC RAM has a simple comprehensive model and tool, that can be use by library for the beginning of assessment and of the annual evaluation on the future.

C. *Dimensions of DPC RAM*

DPC RAM is divided into two halves and contains 11 sections that each cover a different aspect of digital preservation capability. Organizational or other suitable high level granularity is used to identify organizational capabilities (Fig. 4).

Organizational capabilities		
A	Organizational viability	Governance, organizational structure, staffing and resourcing of digital preservation activities.
B	Policy and strategy	Policies, strategies, and procedures which govern the operation and management of the digital archive.
C	Legal basis	Management of legal rights and responsibilities, compliance with relevant regulation and adherence to ethical codes related to acquiring, preserving and providing access to digital content.
D	IT capability	Information Technology capabilities for supporting digital preservation activities.
E	Continuous improvement	Processes for the assessment of current digital preservation capabilities, the definition of goals and the monitoring of progress.
F	Community	Engagement with and contribution to the wider digital preservation community.

Fig. 4. DPCRAM Organizational Capabilities

Service capabilities		
G	Acquisition, transfer and ingest	Processes to acquire or transfer content and ingest it into a digital archive.
H	Bitstream preservation	Processes to ensure the storage and integrity of digital content to be preserved.
I	Content preservation	Processes to preserve the meaning or functionality of the digital content and ensure its continued accessibility and usability over time.
J	Metadata management	Processes to create and maintain sufficient metadata to support preservation, discovery and use of preserved digital content.
K	Discovery and access	Processes to enable discovery of digital content and provide access for users.

Fig. 5. DPCRAM Service Capabilities

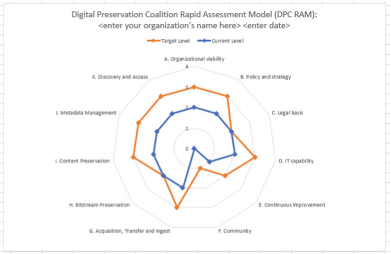

Fig. 6. Current and Future Level Setup

Service capabilities are operational levels that may be viewed at a more granular level and may be exclusive to a single content stream (Fig. 5).

The measurements for each of the five (5) levels are described: (0) Minimal Awareness, (1) Awareness, (2) Basic, (3) Managed, (4) Optimized [21] (Fig. 6).

3 Research Methods

A. *Data Research and Analysis*

This research will be done between the user (librarian and management) and researcher using DPC RAM worksheet as tools, that contains dimensions and level metric to examine the current evidence on the library condition. Researchers must explain about the metric and ensure that user will do understand and will give their honest answer. User answers must be recorded to make sure there is no misunderstanding between user and researcher. Following to examine the current condition of the library, researcher will have discussion with head of library or management level regarding the future level to be achieve, and what to be in place on facilitating the future level. After data regarding current and future level collected, shows visualization of the gap level for each dimension to the user.

B. *Decision Making*

The DPC RAM dimensions measure not only the digital collection, but also policy, librarian skills, authenticity, community, and continuous improvement. Assessment using the worksheet can support management level to have better understanding of the

condition, prioritize on which area that real urgent to continue the business process of the library, and building strategy for library to be long-term manage with proper resources, business process and IT infrastructure to support the accessibility of digital preservation worldwide.

4 Conclusion

The library assessment by using maturity model and metric can measuring the capability and summarize on supporting feedback that can aid in the better understanding of users and librarians of the emerging technology possibilities to be long-term accessible with reliable information. The result of the assessment also can be supporting document to improve the skills of the librarian and IT with the training and workshop opportunity, also engage with the latest knowledge of digital preservation to have service of excellence. Patrons and librarians will have better strategy on priorities of the library, that considerable of investing resources on the future (infrastructure, staff, and other supporting elements).

This research is an initial step to learning on assessment model for library in preserving goals and determining on how the assessment can be applied. Understand that each maturity model with their tool has limitation, this research contributes to the learning process of library assessment with comprehensive concept and helping librarian and patrons to ensure their strategy and decision on addressing to priority target with possible level. To support patrons and the library have a strong and continuing library activity and sustain with the technology competition.

References

1. Kari, K, "Digital transformation of information and its impact on libraries" World Journal of Innovative Research (WJIR), vol. 9, issue 1, pp. 26-30, July 2020.
2. Beevi, F, "Globalization : Evolution and Consequences in Libraries," International Journal of Research and Analytical Reviews (IJRAR), vol. 5, issue 4, pp. 649–655, November 2018.
3. Mehta, D and Wang, X, "COVID-19 and digital library services – a case study of a university library", Digital Library Perspectives, vol. 36, issue 4, pp. 351–363, May 2020.
4. Hussain, A, "Industrial revolution 4.0: implication to libraries and librarians" Library Hi Tech News, vol. 37, issue 1, pp. 1–5, January 2020.
5. Deshpande, J, "Digital Libraries : An overview of Standards , Protocols and Formats" International Journal of Library and Information Studies, vol.8, issue 64344, pp. 181-188, January 2018.
6. Rieger, O. Y, "The State of Digital Preservation in 2018 A Snapshot of Challenges and Gaps", in Ithaka S+R issue brief, pp. 1–15, October 2018.
7. Cun, A, Abramovich, S, and Smith, J. M, "Library and Information Science Research An assessment matrix for library makerspaces. Library and Information Science Research", vol. 41, pp. 39–47, February 2019.
8. Maemura, E, and Becker, C, "Organizational Assessment Frameworks for Digital Preservation : A Literature Review and Mapping", Journal of the Association for Information Science and Technology, vol. 68, pp. 1619-1637, July 2017.
9. Clark, H, "What are maturity models, and should I be using one?", Arkivum blog, September 2021.

10. Zierau, E, Mcgovern, N. Y, and Schaefer, S, "An Overview of the Digital Preservation Storage Criteria and Usage Guide", Short Paper, 16th International Conference on Digital Preservation iPRES 2019.
11. Addis, M, Chandra, S, Dhanaraaj, S, Fowler, R, Kirkhope, D, Nell, A, Silk, J, Vass, T, and Ward, D. "Scalable and Sustainable Long Term Digital Preservation of Scientific Datasets", 17th International Conference on Digital Preservation iPress 2021, pp.1–10, October 2021.
12. Indrák, M and Pokorná, L, "Analysis of digital transformation of services in a research library", December 2019.
13. Sandhu, G, "The Role of Academic Libraries in the Digital Transformation of the Universities", 2018 5th International Symposium on Emerging Trends and Technologies in Libraries and Information Services (ETTLIS), pp. 292–296, 2018.
14. Railean, E, "The Impact of Digital Technologies on Metacognition", In Metacognition and Learning Strategies in the Age of Globalization, vol. 2, issue 2, pp. 1379–1793, July 2017.
15. Sharma, S, "Transformation of Library Resources: Role and Impact of Smart E-learning in Higher Education and Research", vol. 6, pp. 84–87, March 2019.
16. Thurlow, E, "Preserving an emerging digital arts landscape : digital preservation at University of the Arts London", pp. 78–82, 2013.
17. Teichert, R, "Digital Transformation Maturity: A Systematic Review of Literature", vol. 67, issue 6, pp. 1673–1687, 2019.
18. Grover, B and Damle, M, "Comparison of Select Digital Maturity Models for Digital Transformation Dynamics", vol.17, issue 6, pp. 4836–4856, 2020.
19. Hart, S. and Amos, H, "The Library Assessment Capability Maturity Model: A means of optimizing how libraries measure effectiveness", vol. 13, issue 4, pp. 31–49, 2018.
20. Ashley, L. J and Misic, M, "Digital Preservation Capability Maturity Model (DPCMM)", pp. 152–167, July 2015.
21. Digital Preservation Coalition. 2015. Digital Preservation Handbook (2nd. ed.). Retrieved March 13, 2019 from https://dpconline.org/handbook

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.